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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/429,295	10/28/1999	STEPHEN H. BROWN	10196-1-(125	5753

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EXAMINER

DANG, THUAN D

ART UNIT	PAPER NUMBER
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1764

DATE MAILED: 05/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/429,295

Applicant(s)

BROWN ET AL.

Examiner

Thuan D. Dang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 19 and 20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

Claims 1-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

All of claims are considered to be a process of oligomerization. However, it is unclear which one is oligomerized during the process except claims 3 and 15.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various

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claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mazurek et al (4,788,376) in view of Norris (5,157,201).

Applicants are claiming an oligomerization process which involves contacting a hydrocarbon feedstock containing sulfur with a hydrotreating catalyst in the absence of hydrogen. The dependent claims contain limitations directed at specific catalyst combinations and process conditions.

The reference of Mazurek et al. (4,788,376) discloses an oligomerization process. See column 1, lines 7-12. The process involves feeds including butylene (butylenes = C₄). See column 2, lines 15-20. The feed can comprise a diene in an amount from 1-1000 ppm. See column 2, lines 23-25 and 32-36. The lower olefinic feed is derived from pyrolysis gas. See column 1, lines 26-34. Mazurek et al. (4,788,376) teaches that it is within the scope of the invention to use "all" catalysts which are effective for the oligomerization of olefins to higher hydrocarbons. See column 4, lines 42-45. Suitable oligomerization catalysts include heterogeneous (solid) catalysts. See column 4, lines 48-51. The reference further teaches that catalysts are known for the conversion, e.g. oligomerization, of olefins.....other catalysts which have been employed for similar purposes include oxides of cobalt, nickel, chromium, molybdenum....on supports such as alumina. See column 4, lines 31-35. A metal

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supported catalyst can be combined with the oligomerization catalyst. See column 3, lines 11-20. The supported catalyst can be combined nickel and molybdenum on a support such as alumina. See column 3, lines 15-20 and 26-30.

Mazurek et al. (4,788,376) discloses process conditions including a temperature of 100-500°C (212-932°F), a pressure of 0.1 to 100 atm (1.5-1470 psig), and a WHSV of 0.2 to 20. See column 5, lines 59-67.

Mazurek et al. (4,788,376) succeeds at disclosing an oligomerization process which involves contacting a hydrocarbon feedstock with catalyst containing components corresponding to those claimed by applicants. In addition, the reference discloses overlapping process conditions. Since the reference does not disclose the use of hydrogen in the oligomerization zone, it is considered to disclose an oligomerization in the absence of hydrogen.

Several differences are noted between applicants' process and the reference of Mazurek et al. (4,788,376). The reference of Mazurek et al. (4,788,376) is silent about the feedstock containing sulfur. In addition, the reference is silent about the oligomerization of the sulfur containing molecules.

The reference of Norris (5,157,201) is cited for the general teaching that it is known in the art that higher olefin plants typically use a feedstock which normally contains butylenes and 5-50 ppm of various sulfur species. See column 1, lines 36-44 and column 9, lines 39-41. The reference further teaches that during the oligomerization, the sulfur species tend to become incorporated into the higher olefins. See column 1, lines 46-50. Note; The disclosure of "about" 50 ppm is considered to encompass greater than 50 ppm.

Since the process of Mazurek et al. (4,788,376) involves the production of higher

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hydrocarbons from a C4 olefin feed in the form of butylene, it would have been obvious to one of ordinary skill in the art at the time the invention was made to oligomerize a butylene feedstock containing sulfur impurities because the reference of Norris (5,157,201) teaches that higher olefin plants typically use olefinic feedstock which normally contains from "about" 5-50 ppm of various sulfur feeds. See column 1, lines 46-51. Correspondingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to oligomerize any amount of sulfur which may be present in propylene feed because the reference of Norris (5,157,201) teaches that it is known that sulfur which may be present in the feed is incorporated into higher olefins. It would appear that any sulfur present, including 1 % or 10,000 ppm, would also be incorporated into the final oligomer. Since it is known that sulfur present in the feed will become part of the oligomer, one of ordinary skill in the art desiring or willing to accept a higher level of sulfur in the oligomer would process a feed with higher amounts of sulfur. Applicants have not demonstrated the criticality of 1% (10,000 ppm) sulfur in the feed. In addition, applicants' 95% sulfur conversion would naturally result from the process produced by the combined teachings of Mazurek et al. and Norris because the same conditions and feed amounts would yield a similar conversion percentage.

In addition, it would have been obvious to one of ordinary skill in the art at the time the invention was made to select any combination of metals and metal oxides in the disclosed catalyst, including applicants' NiMo/alumina or mixed NiMo or CoMo oxides, because the reference discloses that such metal/metal oxides are known to accomplish the desired conversion.

Response to Arguments

Applicant's arguments filed on 10/15/2003 have been fully considered but they are not persuasive.

The argument that Norris actually teaches away from the present invention as disclosed on column 1, lines 47-55 and Norris' invention is solely directed to removing sulfur from feeds using metal oxides to adsorb sulfur species is not persuasive since as interpreted by the examiner from the teaching of Norris on column 1, lines 47-55, one having ordinary skill in the art at the time the invention was made would obviously have been motivated to using the Norris teaching to modify the Mazuzek process by using an olefinic feed having an acceptable level of impurity of sulfur to arrive at the applicants' claimed process according to the desired purity of the final product.

The argument that the advantage of a process capable of operating with such high sulfur feeds is quite manifest as shown in examples 3 and 5 is not persuasive since a feed containing the same amount of sulfur such as 1% would be expected to be able used as the feed of Mazurek according to the desired purity of the final product.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thuan D. Dang whose telephone number is 571-272-1445. The examiner can normally be reached on Mon-Thu.

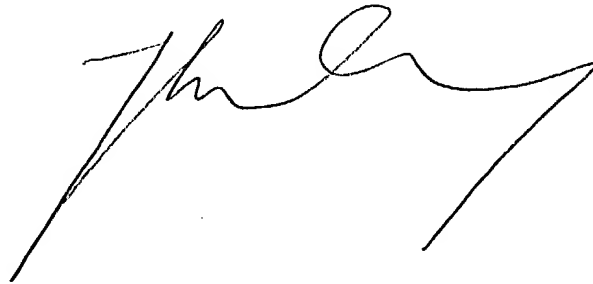
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Thuan D. Dang
Primary Examiner
Art Unit 1764

09429295.20040503
May 3, 2004

A handwritten signature in black ink, appearing to read 'Thuan D. Dang', is written over the printed name and title.